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ABSTRACT

A continuing education program to provide technical training or consultation for laboratory technologists practicing in rural and urban Utah has been established by the Centers for Disease Control and the Utah State Department of Health under the name Project PEER (Pursuing Excellence through Education Regionally). The core of the program is a series of travelling workshops for peer support and interaction, and the workshops are written to be pertinent to statewide needs. During planning for each workshop, a one-page survey is distributed to assess the needs on that topic. Each workshop is presented in six locations: occasionally participants are from neighboring states. Fees are minimal at three to five dollars per workshop. A hematology workshop was the first to run, in August-November 1980, and a follow-up exercise consisted of an evaluation of participant performance changes (on a smear test to be mailed in, and a short test of workshop content). At the time of the first follow-up, preregistrants for the following sessions and a control group were also surveyed with the same instrument. Improvements were made, and the second series, workshops on urinalysis, was undertaken with pretests, a similar format, and the follow-up test. Results of this workshop were felt to be better, and a new urinary crystal was also discovered. Another round of workshops is planned, but because of discontinued funding, another source of support is being sought. (MSE)

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Project PEER: Continuing Education in Utah

The Utah State Department of Health and the Centers for Disease Control are currently involved in their third contractual agreement focused toward providing technical training or consultation for laboratorians currently practicing in rural and urban Utah. This continuing education program operates under the acronym of Project PEER. This name signifies a project directed toward Pursuing Excellence Through Education Regionally, the first letters in the phrase spelling out PEER. It was also hoped that this term, peer, would clue our participants that these travelling workshops were an opportunity for face-to-face interaction and the forming of support groups to work toward solving common laboratory problems.

Lively duscussion has been evidenced too during workshop breaks and laboratory time. Often a rural laboratorian asking the technologist who lives in the next town or whoever is in attendance if they have ever encountered such-and-such a problem and then each sharing with the other their attempts to solve the problem. If neither has discovered the solution yet, at least no further duplication of effort is required on unviable possibilities. The workshops have also been a meeting place where laboratorians who have consulted one another by phone on numerous occasions, yet have never met one another have that opportunity. A sense of the laboratorian community in Utah has been growing through our efforts.

Project PEER operates out of offices within the State Health Laboratory in Salt Lake City, Utah. Workshops are planned and written or in one occasion were purchased and adopted within these offices, so content is pertinent to State-wide needs. The development, coordination and teaching of these workshops is accomplished by myself, another bachelor degreed medical technologist and a full-time secretary.

An extensive, voluminous needs assessment was completed in early 1978, which has been used to select workshop topics. In addition the Laboratory Improvement Section of the State Health Laboratory provides proficiency testing data for all laboratories participating in the various programs and personal remarks are solicited from the Medicare surveyors as clinical laboratories across the state are inspected. Also in initial planning steps for each workshop a one page survey is distributed throughout the state to sample immediate perceived needs relative to the topic selected.

As a block of training is developed and materials gathered, multiple sites are arranged throughout the state for presentation of the workshops. Each workshop is scheduled for presentation six times. We travel with all the workshop supplies to far northern Utah where laboratorians from Idaho and Wyoming have joined us; to far southern Utah where two laboratorians serving a mission in an Adventist hospital on an Indian reservation spanning Utah and Arizona join our ranks. Workshops are arranged for middle eastern Utah; central Utah; and in Salt Lake City, the state capitol and largest city in Utah, we schedule two workshops at differing times to meet the demand.

Workshop registration fees are set minimally at $3.00 - $5.00 for a one to two day workshop, whether wet or dry. The small fee was instituted to

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alleviate a problem of non-attendance following pre-registration. Some monetary commitment seems to aid follow-through in our experience.

The design for gathering registrations for these workshops have evolved from a strict random assignment of laboratories to treatment or control groups and restricting registration packets to the appropriate laboratories to now scheduling four workshops (one a week for four weeks) in northern Utah, southern Utah, Salt Lake City, and eastern or central Utah. Then a nine-week delay period occurs where no workshops are offered but impact evaluation is initiated and the subsequent presentation of two additional workshops in Salt Lake City again, and the other in eastern or central Utah depending on the scheduling of the prior workshops.

All laboratorians receive notification of all six workshop locations and dates. They select the particular workshop which best fits their schedule. In our impact or performance change evaluation we thus label those who have attended one of the first four presentations of the workshop as our treatment group. These individuals attend our workshop and are then asked to complete our evaluation tool. These laboratorians who registered into the latter two offerings of the same workshop, we label our control group. These individuals complete the impact evaluation tool prior to their attendance at the workshop. Our statistical analysis consists of a comparison of these two groups.

Now on to specifics: A Hematology workshop was developed in the Project PEER offices in the summer of 1980 entitled "Lymphocytes and Leukemia". It was based largely on materials presented by Dr. Marguerite Candler Ballard in a Blood Morphology Part II workshop which I attended at the Centers for Disease Control in Atlanta, Georgia.

The workshop started on a basic level by reviewing the normally found formed elements in peripheral blood stained with Wright's stain. In-depth discussion followed on each major cell line including maturation sequences, techniques to prepare optimal blood films, Wright's staining, and infectious mononucleosis. Numerous handouts, including the Abbott manual, and carousels of Kodachrome slides were utilized to aid the participants. Stained smears of normals, infectious mononucleosis, and acute leukemias were available for microscopic examination during laboratory time on both days. Day two consisted of a brief review of Day one and then an introduction of the French-American-British or FAB classification for acute leukemias, red cell morphology terminology, and quality control in the hematology laboratory. Examples of the acute leukemias were available this day for individual microscopic review. Pre- and posttests were administered in addition to the distribution of workshop evaluation forms.

The workshops began in August, 1980 and concluded at the end of November, 1980; this span including our nine-week delay for impact evaluation. A total of seventy-six laboratorians attended this workshop from fifty-two laboratories across Utah.

The impact evaluation tool was developed within the Project PEER office and was entitled a Hematology Self-Assessment Unit. Our philosophy was to attempt to measure performance changes in those laboratorians who attended the Workshop and also to assist each laboratorian who completed the unit in identifying for themselves areas of weakness in the general area of hematology.

The format consisted of a brief section asking demographic information for tabular purposes, a slide mailer containing two peripheral blood smears fixed in methanol, case histories on the smears and a request for each laboratorian to stain the smear and perform a differential, white blood cell and platelet estimation, and comment on red cell morphology. Next thirty-five multiple choice or matching questions covering the workshop materials and the general area of Hematology were presented. Then each participant was asked if recent changes had been made in laboratory procedures, policy, and/or individual proficiency in selected areas or if changes were needed (a perceived change) or if no change was anticipated. A tabular chart was available for responding to these categories; and finally five questions were asked with space to answer regarding future workshop topics they would prefer, additional comments, whether the manuals have been helpful and so on. The slides and paper portion of the impact evaluation tool was mailed to each laboratorian and they were instructed to complete it at their leisure and return the paper portion to the Project PEER offices within 30 days. The slides were retained by each participant for their own slide files. Upon receipt in our office a xerox copy was made. The self-asessment unit was returned unmarked to each participant with a complete set of referenced answers and explanations for all questions and case histories. The only markings made in our offices were made on the xerox copies which are retained in our files as part of our contractual agreement with the Centers for Disease Control. We did not indicate to anyone whether their responses were correct or not, leaving this up to the individual to ascertain upon reading the references answers and their own responses. This was meant to also be an individual learning experience above and beyond the workshop itself.

Our results: Seventy-four self-assessment units were mailed, thirty-five to those who had already attended the workshop or the treatment group and thirty-nine to those who had not attended but were pre-registered to attend future offerings or the control group.

Overall return rate was 48/74 or 65%. The return rate for the treatment group was 18/35 or 51% (our lowest return) and the control group was 30/39 or 77%.

A scoring key was developed prior to examination of any of the returned units. Differential results were compared to an average result of differentials performed on the peripheral smears by myself, a bachelor degreed medical technologist and an oncology technologist. One point for each differential percentage within $\pm$ 5 percent, zero for greater discrepancies. Each test item was also awarded one point if correct, zero is incorrect. The units were scored by myself and my partner with 10 units scored by both of us as a reliability check. No discrepancies were noted between ourselves as scorers.

The t test for differences between means was used to compare treatment and group control means for results on the two fixed smears and the paper and pencil test items. Part II was the smears:

Treatment		Control
N=17		N=26
$\bar{x}$=14.8		$\bar{x}$=13.9
S. D.=2.01		S.D.=2.4

$t_{(41)}=1.28$ N.S.

Part III was the test items:

Treatment	Control
N=18	N=30
$\bar{x}$=25.2	$\bar{x}$=19.3
S.D.=3.1	S.D.=5.8

$t_{(46)}=4.01$
Significant at p=0.001 level

The next overhead details for the subject categories presented from the fifteen individuals who had already attended the workshops and completed this part of the self-assessment, the percentages where actual changes in laboratory policy or procedures were made and areas where a perceived need was detected. Changes made included such things as making smears differently so blood doesn't touch the edges, switching stains, adjusting the microscope light differently, changing criteria for band vs. seg identification, instituting new red blood cell morphology nomenclature, or purchasing new references. As you can see we had from 0-27% with a mean of 12.8%, of the laboratorians indicating changes are needed, and 0-33% with a mean of 16% indicating changes have been made.

The non-significant findings with the differentials was disappointing, but other areas certainly indicate changes are being made back in the laboratories and the individual laboratorians are retaining the knowledge over the one to two month delay period since attending the workshop.

So we tried again!

A Urinalysis workshop was developed next. We called it "Fundamental Urinalysis". Out first presentation of this one-day, dry workshop was in Salt Lake City on January 8th of this year. We completed this block of workshops in late April. Our total attendance was 108 laboratorians from sixty-two laboratories across Utah. A pre- and posttest was utilized with workshop evaluation forms distributed also.

Topics covered included the anatomy of the urinary tract, specimen collection, specific gravity, dipstick usage and chemical reactions, confirmatory tests, microscopic examination of sediment, and quality control. This was our first workshop aimed at bench technologists plus physician office personnel. Response was staggering. The one-day format worked well and these individuals are in need of basic laboratory training. Participants broke into 49% MT's, 31% lab assistants, 11% medical assistant's, 8% nurses and 1% LPN's.

Our impact evaluation tool was again developed as a urinalysis self-assessment unit. The same basic format as described for hematology was utilized with minor changes. Instead of two peripheral smears, we mailed out ten kodachromes of urinary sediment. The kodachromes were not utilized in the workshop. They were photographed mainly within the State Health Laboratory and one contributed from a major area hospital. The participants were asked to identify the crystals or formed elements in the kodachromes. Here also, the participants were allowed to keep the kodachromes to aid in their own individual learning in conjunction with their returned, unmarked self-assessment unit and the set of referenced answers.

The units were mailed in early March to one hundred and two laboratorians. Return rates are 46/71 received from the treatment group or 65%, 21/31 received from the control group or 68%, for a total return of 67/102 or 66%. Part II consisted of twenty multiple choice items in urinalysis. Part III was six patient histories and laboratory results where questions were asked regarding possible laboratory result discrepancies and probable disease states. In Part IV the ten kodachromes of urinary sediment were to be identified.

The t test was used to examine results from Part II which was wholly cognitive as separate from Parts III and IV which were performance measures.

Part II

Treatment	Control
N=46	N=21
$\bar{x}$=16.4	$\bar{x}$=13.6
S. D.=2.4	S.D.=4.4

$t_{(65)}=3.35$ p=0.01

Part III and IV

Treatment	Control
N=46	N=21
$\bar{x}$=22.1	$\bar{x}$=17.6
S.D.=4.3	S.D.=8.7

$t_{(65)}=2.84$ p=0.01

The last overhead provides evidence for changes being made or a perceived need for changes in laboratories following attendance at the workshop. Changes made included such things as meeting with nurses to get specimens to the laboratory sooner, using more complete instructions with patients, storing urinometers in water, calibrating more frequently, better timing of dipsticks, examining more fields for microscopics, adjusting the microscope light differently, initiating a quality control program, and ordering reference material.

The percentages of areas needing change range from 0-17% with a mean of 8% and percentage of changes already made go from 2-17% with a mean of 8%.

We were pleased with these results. We did see a new urinary crystal thought to exist in Utah--the Bence-Jones protein crystal. Aren't you glad they were registered into a workshop?

In summary, let me say that certainly my design was flawed through the participants self-selecting themselves into the two treatment groups. However, no significant differences were noted when examining indicators after the studies were completed. Number of tests per year in the discipline, years at job, and years of experience were examined.

I purpose that continuing education does have impact on laboratory practice. If you are ever required to evaluate your continuing education activities, I recommend utilizing multiple indicators. In addition to the tools I have already discussed which we have utilized in these 2 blocks of training, Project PEER has used simulated clinical specimens, case histories with colored photographs, numbers of specimens referred to State Health Laboratories (we saw a large rise following a parasitology workshop), examination of proficiency testing yearly summarizes, and the direct approach of the chart asking if changes have been made, or needed changes are perceived.

Currently, Project PEER is involved in yet another round of training and impact evaluation. With funding being discontinued after September 30, 1981 of this year, I am now busily exploring alternate funding to continue the workshop offerings.

Hematology

	Change Needed	Change Made
Specimen Collection	13%	7%
Smear Preparation	20	27
Smear Staining	0	13
Smear Evaluation	27	13
Criteria for WBC identification	0	33
Criteria to differentiate Bands-Segs	13	20
Terminology	20	13
Selection of instrumentation/Procedures	20	0
Use of controls	7	13
Instrument calibration	27	20
Use of microscope	7	13
Reference availability	0	20

Urinalysis

	Change Needed	Change Made
Specimen Collection	13%	13%
Specimen Handling	17	9
Use of urinometer/refractometer	4	13
Quality control of urinometer/refractometer	9	15
Use, handling of reagent strips	4	11
Storage of strips	0	2
Quality control of strips	11	4
Glucose confirmatory tests	9	2
Protein confirmatory tests	9	2
Bilirubin confirmatory tests	11	2
Sediment preparation	0	13
Sediment identification	4	17
Sediment reporting	2	11
Use of microscope	7	15
Handling of discrepancies	11	2
Use of reference materials	9	11
Procedure manuals	13	7
Use of controls	17	2